Pro Swing Analyzer

"Game on: The watch that improves your game."

"It's in the watch"

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1.0 Chronos Watch Summary / Abstract / Proposal

When the Chronos watch was first announced for the Co-Op challenge, a bunch of ideas were thrown around about using the watch to control devices like your television or stereo. Although most of these ideas are useful, none of them reached out to potential consumers wanting to buy this watch. Feeding off the idea of pleasing a consumer, I started at the origin with watches original functions. This is a typical sports watch with functions such as a heart rate monitor, altimeter, stopwatch, running speed, etc. All sports enthusiast related functions. So, the natural progression is to improve the watch for the athlete. The goal is to give the target consumer, the athlete, additional reasons to make a buying decision as opposed to "couch potato" features like a TV controller giving no added convenience that a normal controller doesn't already contain. The Pro Swing Analyzer, the next generation of sports watches.

1.1 Mission

To create an easy to use, affordable, and practical application that athletes can use to improve their game.

1.2 Keys to Success

1. Expand the watch industry to integrate applications for functional sports such as golf, baseball, racquetball, etc.

2. Creating an in depth analysis, but keeping the user interface simple.

3. Maintaining a competitive price, while adding more features and functionality to the sports watch.

2.0 Product and Services

We are marketing active software for the TI Chronos sports watch that can analyze and improve an athlete's game. The application currently analyzes and compares a golfer's swing for club position, swing speed, and club angle. All of which are keys to a successful shot.

2.1 Product and Services Description

The graphical interface software uses a very simple process for the user to analyze their swings. The steps are drawn out through the flow given below along with in depth descriptions of each of the buttons.

Graphical Interface Controls:

Sync: Sync provides the user the ability to download data from the watch to their PC.

Start/Stop: Start/Stop allows the user to log the current swing. There is also a start/stop switch located on the watch. Also, note the data will automatically stop once the watch is back to the origin or at the point of contact with the ball.

Ideal/Compare/Save: These three functions are used simultaneously to help the user track and log the swings as they make them. For first time use, the user should look for a swing that felt smooth, while also making good contact with the ball. Once you have found the "Ideal" swing, the user presses ideal to set it as their 'perfect' swing. All future swings follow the same process except now; the user can compare future swings to the ideal swing, save a new swing, and/or replace the current ideal swing with a new ideal swing.

Position Only Tab: The position tab shows the position of the club as you swing. This is very important information to the user when trying to perfect a certain swing technique.

Speed Tab: The speed tab is used to compare the ideal swing speed at the different intervals/positions of the swing. Slowing down or speeding up certain parts of a swing can make a difference in the outcome of the shot, ranging from changes in ball distance, accuracy, and flight direction.

Club Face Tab: The club face tab is used to compare the club face angle difference from the ideal club face angle at different intervals/positions of your swing. This is done by have the ideal at 0º. (outside = + Δº, inside = -Δº) This is critical to the direction of flight the ball will take. A positive angle differential would most likely result in a slice, or a banana shaped curve going right, indicating an open face upon impact. A negative angle differential would most likely result in a hook, or a banana shaped curve going left, indicating a closed face upon impact.

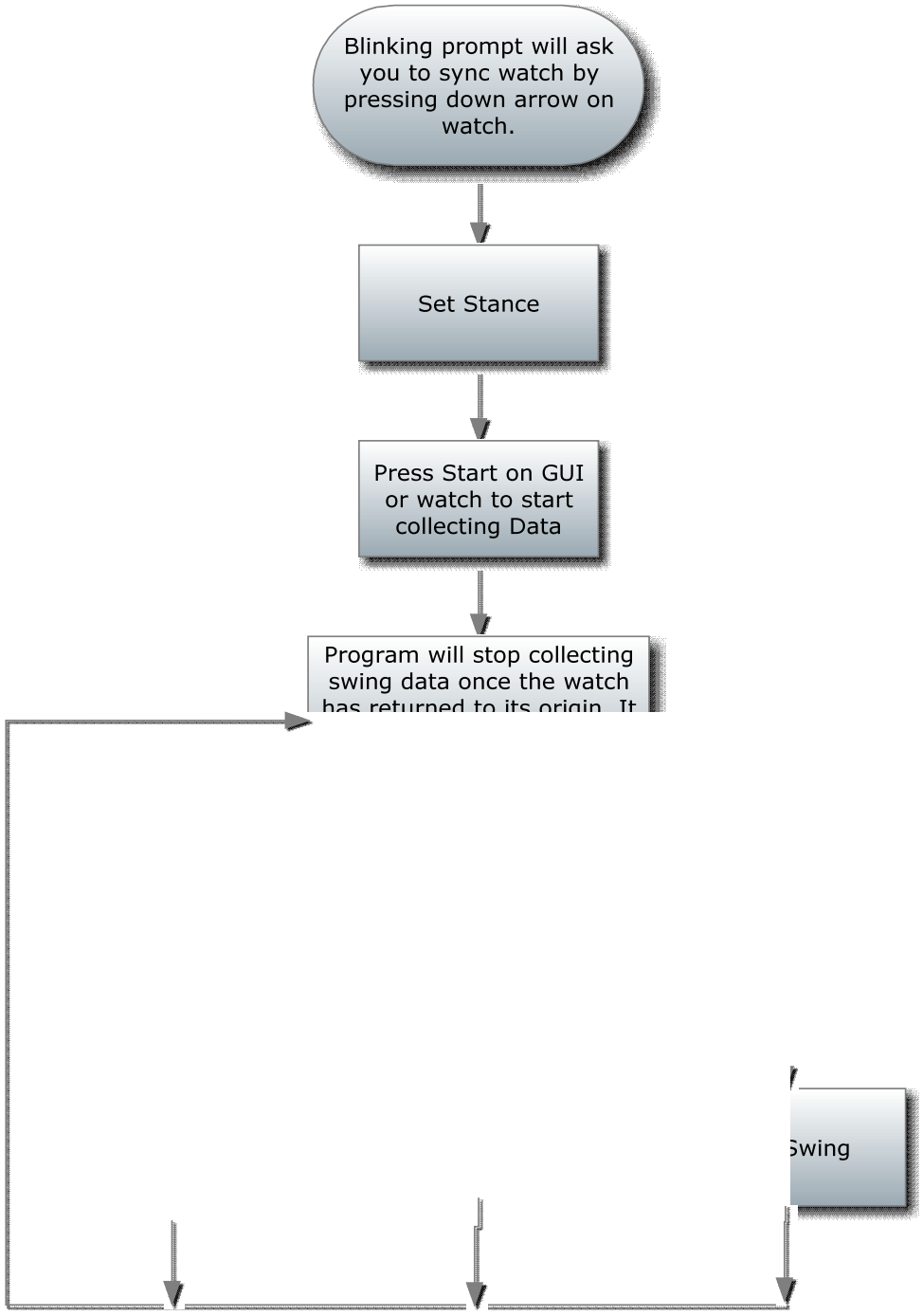
Front and Side View Animation: These animations correspond to the three tabs listed above, giving a visual effect of when errors occur, and how much of an error was made at the different intervals of the swing. The position of the swing is shown on every tab, but the difference in error, ranging in color to correspond with how close you are to the ideal swing, match with the tab that you have selected. For instance, if you are on the speed tab, the position of the swing is shown, but the colors along the course of the swing are comparing the swing speed at that point with the ideal swing's speed at the same point in time.

Line Graphs: The line graphs, just like the animation, also correspond to the tab that you have selected. This data is just shown linearly with time. This is just a second visual to see when the swing differs from the ideal.

Hard Data: This shows a total deviation from the ideal across the entire swing, along with the club head angle upon impact with the ball.

Legend: When comparing to the ideal swing (shown in white), a green trace indicates a close trace, a yellow trace indicates that the traces are close, and the red trace indicates that a different swing is taking form or poor technique.

Below is the Process Flow in order to use the User Interface to analyze swings.


Blinking prompt will ask you to sync watch by pressing down arrow on watch.
Set Stance
Press Start on GUI or watch to start collecting Data
Program will stop collecting swing data once the watch
Swing

2.2 Competitive Comparison

The Pro Swing Analyzer is an athlete's best friend, while providing professional swing coaching for personal, convenient, everyday use. Its affordability makes it the easy choice

when it comes to buying this type of product. Not to mention that it all fits into a sports watch!

Similar products require bulky inconvenient hardware that can't be used for everyday use, such as swinging pads, or video recording. Not only making it inconvenient to take to places like the driving range or golf course, but also making the price of the product exponentially more expensive. These products also include software that includes excessive information with confusing interfaces. The watch follows the KISS principle, Keep it Simple Stupid. Simplicity and convenience improves adoption rates and sales.

2.3 Sales Literature

To ensure early adoption and understanding of how to use the device, the product will be packaged with a user's manual. In addition, two You Tube videos will be produced to illustrate the features and functions of the watch, one video being an instructional video and one being a promotional video for use in web campaigns. Golfers historically buy new equipment that have solid endorsements. The promotional video will show both everyday golfers (men and women) using the device, teaching pros using the device and an existing tour pro using the device. By utilizing You Tube, most user's can access the instructional video or promotional video via mobile devices while on the course.

TI should consider partnering with an existing ball or equipment manufacturer (like Titlist or Calloway) to help promote the product with an already strong brand. For example, seeding the market with users could be accomplished by Calloway or Taylor Made providing a free watch with the purchase of a new set of clubs. This provides a win-win for both companies.

2.4 Technology

MSP430, LabView, RFID, accelerometer, heart rate monitor….

2.4.1 Source Code and LabView VI

Here is a quick overview of how the watch uses LabView along with the accelerometer collects the data. When the watch is connected, LabView uses functions in the provided DLL's from the Chronos control center to access the COM port and get the streaming accelerometer data from the watch. When you click sync, the COM Port and access point are reset and the data buffer is initiated. LabView then waits for the watch to start transmitting and receiving good data. When it sees this, a sequence starts that collects the data which is in a32bit binary form, this is then split into 4 ways: z data, y data, x data, and button press. All four 8bit words are added to arrays which are stored for later use. This sequence continues until the computer receives a value of 255 in the button value. This means that the watch is no longer transmitting, and the com port is not receiving any data. Next, the correct shutdown sequence is initiated where the buffer stack and then the com port are closed. If this does not happen correctly, when you attempt to connect again, it thinks that it is still in use, and a full program restart is required. This is handled by doing a full shutdown sequence before the get data sequence starts. After the shutdown of the COM port, labview processes the arrays to convert the raw data (in G's) to actual acceleration values (in m/s^2) and stores these values along with displaying it. Under Product and Services can be found the user interface flow on how to use the graphical interface after the device is ready to go.

2.4.2 Physics and Mechanics

Physics equations from math for swing.

2.5 Future Products and Services

This product has nearly endless possibilities not only for improving the analysis of each swing, but also for progressing into other sports.

Improved analysis:

- Ability to analyze all clubs in the bag from the driver to the pitching wedge.
- A library of clubs can be added to sync with the particular brand of golf clubs for exact weight and length.
- A Bluetooth club attachment that can give you quick feedback on the golf course or driving range. This could also be used to avoid using the RF USB port for communication with the computer.

Other sports:

- This kind of technology can be helpful for baseball, tennis, hockey and racquetball swings. It can also be applicable for baseball and softball pitchers throws and bowling throws. Any motion with a club or your hands can be analyzed.

New Technology:

- To go apps for Smartphone's.
- Bluetooth connection.
- Voice recognition and live voice feedback.

3.0 Market Analysis Summary

The business of sports, sports analysis and fitness is huge, and our product is fit to satisfy this wide array of industry. Pro Swing Analysis focuses from the top at sports industry, to sports product distribution, and most importantly the consumer.

3.1 Industry Distribution Analysis

Product distribution and buying support for this product will be found to be standard and convenient.

1. Chain stores and computer superstores: these include major chains such as Sports Authority, Dicks, Wal-Mart, etc. This type of atmosphere usually offers decent walk-in

service, and is often warehouse-like locations where people go to find products in boxes with very aggressive pricing, and limited support.

2. Online order: If you can find in a store, most likely you can buy it online, so we plan to follow this standard by selling the product online, and allowing extensive support and information.

3. Channel Distribution: By partnering with an existing golf brand like Taylor Made or Calloway, the device can be packaged with the clubs. This will accelerate brand recognition by leveraging a strong brand already on the market.

3.1.1 Industry Participants

1. Sports Watch Companies – Any company who already markets a watch that is like the TI Chronos watch. This would provide an upgrade to their current customers who would be interested in adding the Pro Swing Analyzer feature to their watches functionality.

2. Distribution Companies – Traditional retail distribution companies like Wal-Mart, Dick's Sporting Goods and Amazon are ideal.

3.1.2 Main Competitors – SWOT Analysis

Using a Strengths-Weaknesses-Opportunities-Threats (SWOT) Chart, we researched the competitor's products.

Competitive Products:

Full Swing: This is an at home full golf theater experience that allows you to play full rounds of golf and practice on through a simulating theater screen.

Strengths: • Live video screen of each shot at your home.	Weaknesses: • Expensive, no swing analysis, just a virtual game basically. • Takes up a full room to use.
Opportunities: • Technology is there for them to have swing analysis.	Threats: • More affordable products. • More mobile or smaller devices. • Devices you can use at golf course or driving range.

Golf LaunchPad : Made by ElectricSpin, this product mixes video analysis with a ball contact launch pad to help with analysis of your swings. It also can be used an at home game experience using video games such as Tiger Woods.

Strengths:	Weaknesses:
• Live video screen of each shot at your home. • Swing Analysis software for PC.	• Expensive. • Complicated software. • It can only be used at your home, and not on a golf course.
Opportunities:	Threats:
• Making a portable device that saves swing data to use for PC swing analysis.	• More affordable products. • More mobile or smaller devices. • Devices you can use at golf course or driving range.

iSwing: This is an iPhone app where you video record your swing then use the app to analyze it.

Strengths:	Weaknesses:
• This is convenient and cheap if you have an iPhone. • Easy to use application for your phone so you can take to golf courses and driving ranges for analysis. • Video and photo analysis.	• This can be expensive because you must have an iPhone to use app.
Opportunities:	Threats:
• Expanding the swing analysis to be more extensive using computer software when phone is synced.	• Apps for other cell phones, apps they don't require expensive hardware.

3.3 Market Analysis

The market for golf is endless, and everyone that plays golf is most interested in one thing, improving his or her game. The worldwide golf equipment market is at $5.8 billion today and is projected to grow to $6.58 billion by 2015. Then by mixing functional sports with the industry of fitness through this watch interface, a whole new market of watches is being opened, especially with the expansion to other sports. The fitness market is projected to surpass $44 billion this year, so by attacking both of these growing industries simultaneously, the future for this watch in the market is bright.

4.0 Strategy and Implementation Summary

1. Emphasize simplicity and convenience.

This watch can make it easy for you to time a run in the park, then simply change the mode to go play a round a golf and improve your swing.

2. Focus on target markets.

There are two primary markets to focus promotion efforts on, Golf and Fitness. The goal is to motivate both existing sport watch buyers and golfers.

3. Differentiate from competitors

The primary market differentiator is a state of the art watch providing additional value for a similar cost of other watches.

4.1 Pricing Strategy

The goal is to deliver a sports watch, with this included interface, for close to the same price as a competitive sports watch. At the "moment of truth" when the buyer is making a purchase decision, they should pick this watch over others due to the extra value at the same or near the same cost of comparable products.

4.1.1 Promotion Strategy

The key to winning over our target buyer is to first establish credibility. Credibility will be established through trial distribution of watches to tour pro golfers , PGA teaching pros, student golf camps, golf coaches, and golf course pro shops. We will generate "buzz" through viral efforts and traditional efforts like web and TV advertising. We will leverage feedback from the trial group via endorsements integrated in the promotional messaging.

4.2 Sales Strategy

Our sales strategy is a collaboration of distribution to stores and channel partner relationships.

1. Distribution: Discounts for buying our watch in bulk, or marketing displays in retail stores will help to sell our part globally.
2. Channel Partner Relationships: Established brands like Calloway and Taylor Made are always looking for a competitive edge to sell their products, especially high ticket items like a new set of clubs. Having this watch as an added incentive to buy their clubs would motivate a buying decision driving revenue for the partner and TI.